

## 8-1

## Study Guide and Intervention

## Multiplying Monomials

**Multiplying Monomials** A **monomial** is a number, a variable, or a product of a number and one or more variables. An expression of the form  $x^n$  is called a **power** and represents the product you obtain when  $x$  is used as a factor  $n$  times. To multiply two powers that have the same base, add the exponents.

**Product of Powers**For any number  $a$  and all integers  $m$  and  $n$ ,  $a^m \cdot a^n = a^{m+n}$ .**Example 1****Simplify  $(3x^6)(5x^2)$ .**

$$\begin{aligned}
 (3x^6)(5x^2) &= (3)(5)(x^6 \cdot x^2) && \text{Associative Property} \\
 &= (3 \cdot 5)(x^{6+2}) && \text{Product of Powers} \\
 &= 15x^8 && \text{Simplify.}
 \end{aligned}$$

The product is  $15x^8$ .**Example 2****Simplify  $(-4a^3b)(3a^2b^5)$ .**

$$\begin{aligned}
 (-4a^3b)(3a^2b^5) &= (-4)(3)(a^3 \cdot a^2)(b \cdot b^5) \\
 &= -12(a^{3+2})(b^{1+5}) \\
 &= -12a^5b^6
 \end{aligned}$$

The product is  $-12a^5b^6$ .**Exercises****Simplify.**

1.  $y(y^5)$

2.  $n^2 \cdot n^7$

3.  $(-7x^2)(x^4)$

4.  $x(x^2)(x^4)$

5.  $m \cdot m^5$

6.  $(-x^3)(-x^4)$

7.  $(2a^2)(8a)$

8.  $(rs)(rs^3)(s^2)$

9.  $(x^2y)(4xy^3)$

10.  $\frac{1}{3}(2a^3b)(6b^3)$

11.  $(-4x^3)(-5x^7)$

12.  $(-3j^2k^4)(2jk^6)$

13.  $(5a^2bc^3)\left(\frac{1}{5}abc^4\right)$

14.  $(-5xy)(4x^2)(y^4)$

15.  $(10x^3yz^2)(-2xy^5z)$

**8-1 Study Guide and Intervention** *(continued)***Multiplying Monomials**

**Powers of Monomials** An expression of the form  $(x^m)^n$  is called a **power of a power** and represents the product you obtain when  $x^m$  is used as a factor  $n$  times. To find the power of a power, multiply exponents.

<b>Power of a Power</b>	For any number $a$ and all integers $m$ and $n$ , $(a^m)^n = a^{mn}$ .
<b>Power of a Product</b>	For any number $a$ and all integers $m$ and $n$ , $(ab)^m = a^m b^m$ .

**Example**Simplify  $(-2ab^2)^3(a^2)^4$ .

$$\begin{aligned}
 (-2ab^2)^3(a^2)^4 &= (-2ab^2)^3(a^8) && \text{Power of a Power} \\
 &= (-2)^3(a^3)(b^2)^3(a^8) && \text{Power of a Product} \\
 &= (-2)^3(a^3)(a^8)(b^2)^3 && \text{Commutative Property} \\
 &= (-2)^3(a^{11})(b^2)^3 && \text{Product of Powers} \\
 &= -8a^{11}b^6 && \text{Power of a Power}
 \end{aligned}$$

The product is  $-8a^{11}b^6$ .**Exercises**

Simplify.

1.  $(y^5)^2$

2.  $(n^7)^4$

3.  $(x^2)^5(x^3)$

4.  $-3(ab^4)^3$

5.  $(-3ab^4)^3$

6.  $(4x^2b)^3$

7.  $(4a^2)^2(b^3)$

8.  $(4x)^2(b^3)$

9.  $(x^2y^4)^5$

10.  $(2a^3b^2)(b^3)^2$

11.  $(-4xy)^3(-2x^2)^3$

12.  $(-3j^2k^3)^2(2j^2k)^3$

13.  $(25a^2b)^3\left(\frac{1}{5}abc\right)^2$

14.  $(2xy)^2(-3x^2)(4y^4)$

15.  $(2x^3y^2z^2)^3(x^2z)^4$

16.  $(-2n^6y^5)(-6n^3y^2)(ny)^3$

17.  $(-3a^3n^4)(-3a^3n)^4$

18.  $-3(2x)^4(4x^5y)^2$